

What is claimed is:

1. A method of scheduling data packet transmission in a data communication network, comprising:
  - computing an arrival time for first data packet relative to a system clock value and an arrival time for a second data packet relative to the system clock value, wherein the system clock value returns to zero after reaching a maximum value;
  - determining a maximum range of arrival times for the first and second data packets; and
  - determining which arrival time will occur earliest by determining whether a difference between the arrival times for the first and second data packets exceeds the maximum range.
2. The method according to claim 1, wherein said data packet arrival times are based on a start of reception time, a data packet length and transmission speed.
3. The method according to claim 1, wherein a lower one of the arrival times occurs earliest when the difference between the arrival times for the first and second data packets does not exceed the maximum range.
4. The method according to claim 1, wherein a higher one of the arrival times occurs earliest when the difference between the arrival times for the first and second data packets exceeds the maximum range.
5. The method according to claim 1, further comprising arranging scheduling values for the data packets in a scheduling heap data structure.
6. The method according to claim 1, further comprising prioritizing the data packets according to their arrival times.

1 7. A method of scheduling data packet transmission in a data communication  
2 network, comprising:  
3 inserting scheduling values for received data packets into a scheduling heap data  
4 structure;  
5 arranging the scheduling values according to assigned priority levels; and  
6 arranging scheduling values for selected data packets based on anticipated arrival  
7 times for the data packets.

1 8. The method according to claim 7, wherein the scheduling values for the selected  
2 data packets are arranged using weighted fair queuing.

1 9. The method according to claim 8, wherein the scheduling values for the selected  
2 data packets include a priority value equal to that of a priority value of another data  
3 packet.

1 10. The method according to claim 8, wherein the scheduling values for the selected  
2 data packets lack a priority value.

1 11. A system for scheduling data packet transmission in a data communication  
2 network, comprising:  
3 a scheduling heap data structure having a plurality of levels for storing scheduling  
4 values for data packets according to their relative priorities; and  
5 a queue controller coupled to the data structure for manipulating scheduling  
6 values in the heap data structure, the queue controller including an apparatus for  
7 comparing anticipated arrival times for data packets including a first memory register for  
8 storing a first arrival time, a second memory register for storing a second arrival time,  
9 and logic for performing 2's complement subtraction on the first and second arrival  
10 times, wherein a carry output of indicates which of the first and second arrival times  
11 occurs earliest according to whether a difference between the first and second arrival  
12 times exceeds a range of arrival times.

- 1 12. The system according to claim 11, wherein said data packet arrival times are  
2 based on a start of reception time, a data packet length and transmission speed.
- 1 13. The system according to claim 11, further comprising arranging scheduling values  
2 for the data packets in a scheduling heap data structure.
- 1 14. The system according to claim 11, further comprising prioritizing the data packets  
2 according to their arrival times.